ELECTRONIC THESIS AND DISSERTATION UNSYIAH

TITLE

PEMBUATAN DAN KARAKTERISASI KOMPOSIT KITOSAN MAGNETIK BERIKATAN SILANG H2SO4 DAN APLIKASINYA SEBAGAI ADSORBEN METHYLENE BLUE

ABSTRACT

ABSTRAK

Komposit kitosan magnetik berikatan silang H2SO4 dibuat dan diaplikasikan sebagai adsorben methylene blue. Pembuatan komposit menggunakan variasi Fe3O4 dan H2SO4. Komposit terbaik kemudian dikarakterisasi menggunakan analisis Fourier Transform Infrared (FT-IR), Scanning Electron Microscopy (SEM) dan X-Ray Diffarction (XRD). Analisis SEM dan XRD menunjukkan ukuran nano dari Fe3O4 sebagai filler pada pembuatan komposit. Pembentukan komposit kitosan magnetik berikatan silang H2SO4 ditunjukkan dengan analisis FTIR, XRD and SEM. Komposit kitosan magnetik berikatan silang H2SO4 terbaik diperoleh pada komposisi kitosan 0,35 g, Fe3O4 0.5 g dan H2SO4 0,02 M. Uji adsorpsi dilakukan berdasarkan variasi waktu, pH dan konsentrasi methylene blue. Kesetimbangan adsorpsi methylene blue menggunakan komposit kitosan magnetik berikatan silang H2SO4 diperoleh pada waktu 25 menit. Kapasitas adsorpsi meningkat dengan peningkatan pH. Data adsorpsi sesuai dengan model isoterm Langmuir dan Freundlich. Berdasarkan model Langmuir, kapasitas adsorpsi maksimum dari komposit kitosan magnetik berikatan silang H2SO4 terhadap methylene blue adalah 20,408 mg/g.

Kata kunci: kitosan magnetik, Fe3O4, methylene blue, adsorpsi, komposit, H2SO4

ABSTRACT
H2SO4 crosslinked magnetic chitosan composite had been prepared and applied as an adsorbent of methylene blue. The composite was prepared with several contents of Fe3O4 and H2SO4. The obtained composite were then characterized by Fourier Transform Infrared (FT-IR), Scanning Electron Microscopy (SEM) and X-Ray Diffarction (XRD) analysis. XRD and SEM analysis confirmed the nanosized crystallite of Fe3O4 as a filler in composite preparation. The formation of H2SO4 crosslinked magnetic chitosan composite were confirmed by FTIR, XRD and SEM analysis. The best H2SO4 crosslinked chitosan composite was found at composition chitosan 0.35 g, Fe3O4 0.5 g and H2SO4 0,02 M. Adsorption experiment were conducted with several contact time, pH and initial concentration of methylene blue. The equilibrium of methylene blue adsorption by H2SO4 crosslinked magnetic chitosan composite was reached at 25 minutes. The adsorption capacity increased by increasing pH. Both Langmuir and Freundlich isotherm models had the good fitting with the adsorption data. Based on Langmuir isotherm model, the maximum adsorption capacity of H2SO4 crosslinked magnetic chitosan composite on methylene blue adsorption was 20.408 mg/g.

Keywords: magnetic chitosan, Fe3O4, methylene blue, adsorption, composite, H2SO4